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The Association between Preoperative Instruction on Length of Hospital Stay in Total Knee Replacements

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THE ASSOCIATION BETWEEN PREOPERATIVE INSTRUCTION
ON LENGTH OF HOSPITAL STAY IN
TOTAL KNEE REPLACEMENTS

by


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Bachelor of Science in Physical Therapy
University of North Dakota, 1991



An Independent Study
Submitted to the Graduate Faculty of the
Department of Physical Therapy
School of Medicine
University of North Dakota
in partial fulfillment of the requirements
for the degree of
Master of Physical Therapy

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1993

This Independent Study, submitted by Beth Darlene Ihry in partial fulfillment of the requirements for the degree of Master of Physical Therapy from the University of North Dakota, has been read by the Chairperson of Physical Therapy under whom the work has been done and is hereby approved.



(Chairperson, Physical Therapy)

PERMISSION

Title The Association Between Preoperative Instruction on Length
of Hospital Stay in Total Knee Replacements

Department Physical Therapy

Degree Master of Physical Therapy

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Date 4-20-93

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ABSTRACT

Preoperative instruction has been a critical aspect of surgical procedure since the 1970s when hospitals started formal programs. With the recent push for health care reform, all aspects of the medical profession are looking toward cost reduction. This independent study proposal was designed to assess the comparison of length of hospitalization in total knee replacement patients who have preoperative instruction versus those who do not receive preoperative instruction. Problem with the prior research involving preoperative teaching included the following: a wide variety of surgical diagnoses, the number of different physicians performing the surgeries, the small sample sizes, and outdated literature. The proposal employs a chart review of an experimental group-control group design. The experimental group teaching program includes viewing a 10-minute video concerning total knee replacement; question/answer session with nursing staff; and review of total knee replacement exercises, transfers, and ambulation with a physical therapist. Patient charts were randomly chosen from the time period January 1, 1990 through December 31, 1991. Each chart met the criteria for selection. Twenty charts were analyzed from each group to determine the average length of hospitalization. An analysis of variance of means was completed, with appropriate t-test application at the 0.05 level of significance. The implications of this study indicate that

additional steps must be taken to continue quality of patient care while reducing overall medical costs. The advent of the preoperative instruction is one quarter of a century old and requires updated data for justification of its use.

CHAPTER I

INTRODUCTION

Total knee replacement has become a welcome addition to the field of orthopedics. The surgery has the ability to restore quality of life by allowing patients to pursue normal activities that have been restricted due to lack of motion and/or pain in the knee. The replacement procedure requires a team effort involving the patient, physician, nursing staff, physical therapist, and others to achieve the optimal result--a pain-free, stable knee-joint.¹

The team effort begins during the preoperative evaluation. The idea of preoperative instruction has root in the late 1960s and matured in the 1970s when hospitals started formal programs.² Preoperatively, a thorough evaluation is essential to establish a baseline of information that not only familiarizes the health professional with the patient, but also familiarizes the patient with the postoperative care of the total knee joint replacement.

There are three general goals of the preoperative visit. The first goal is to assess the patient's functional status, which includes ambulation, transfers, range of motion, and strength. The second is to educate the patient concerning the anatomy, surgical procedure itself, postoperative care of the knee, and to offer psychological and emotional support. The final goal involves instruction of the patient in proper total knee exercises, transfers, and ambulatory techniques.

This baseline information from the patient, coupled with the instruction to the patient, provides the cornerstone of the plan of care.^{3,4}

Because of current concerns on the part of both the hospital and patient regarding the high cost of health care, the health professional must assess all aspects of a patient's care to determine where costs may be reduced without jeopardizing quality. Due to the establishment of prospective reimbursement and diagnosis related groups (DRGs), the amount of reimbursement given to an institution is limited. Hospitals are forced to look at effective means of reducing length of stay and hospitalization.⁵

This study is designed to determine whether or not there is a significant difference in length of hospital stay among total knee replacement patients who have preoperative instruction versus those who do not, thereby determining whether or not it is cost effective to implement preoperative instructions.

Problems with prior research involving preoperative teaching included: the wide variety of surgical diagnoses, the number of different physicians performing the surgeries who have varying protocols, the small samples of many of the studies, and the fact that most of the literature is outdated.

Null Hypothesis

The null hypothesis is accepted for this study. The null hypothesis states that there is no significant difference in the length of hospital stay between the group of patients who receive preoperative instruction and the group of patients who were not involved in the program.

Definitions

The following terms used throughout this study are defined for clarity and convenient reference.

- Length of hospital stay--the number of 24-hour periods the patient remained in the hospital not including the day of surgery.
- Total knee replacement--a surgical procedure used in treating severe degenerative changes of the knee. Both the femoral condyles and tibial plateau are replaced with metal components. The tibial component is covered with a plastic material to allow smooth articulation.
- Preoperative instruction--a teaching plan devised for patients awaiting a total knee replacement. This plan includes viewing a 10-minute video that discusses biomechanics of the knee, surgical procedures, equipment used during and after surgery; discussing psychological or emotional problems with the preoperative nursing staff, which includes a question-and-answer period about the upcoming surgery; reviewing total knee replacement exercises, transfers, and ambulation with a physical therapist.
- Total knee replacement exercises--a series of exercises designed to strengthen the muscles that act upon the knee joint. Exercises include isometric quadriceps and hamstring sets, straight leg raises, and range of motion flexion and extension of the knee.

CHAPTER II

REVIEW OF THE LITERATURE

A review of the medical literature involving preoperative preparation of surgical patients disclosed two areas of concern: the variables influencing a hospitalized patient in the preoperative and postoperative periods, and the approaches used in preparing a patient for surgery.

Three approaches to prepare patients for surgery were found: the psychological, informative, and teaching approaches. Each of these approaches seemed to be of value to the surgical patient, as demonstrated through studies, but the results of the studies varied greatly.

Baudry and Wiener⁶ stated that the task of preoperative preparation was a dual one that gives the patient information as to what he/she may expect and also corrects the misconceptions that lie behind the irrational element. According to these investigators, preoperative preparation is necessary because surgery entails realistic frustrations and stresses that a patient must deal with by his/her "customary modes of adaptation." Therefore, by giving information to the patient about surgery and events following surgery, he/she can attempt to overcome the fright of the unknown, or the "irrational element."

A reliable member of the family as well as the patient should be prepared for the events before, during, and after surgery.⁶ Ravitch⁷ supported this

suggestion by stating that the patient's family should be told the time of the operation, when the patient returns to his/her room, and what types of equipment the patient will be using following surgery.⁷

Johnson⁸ conducted a study with a group of 28 patients who underwent either an elective cholecystectomy or an elective total abdominal hysterectomy. He attempted to show that an experimental nursing approach could reduce the discomfort a patient experiences postoperatively. Using this approach, the nurse provides relevant information about the nature of postoperative discomforts, gives suggestions about activities that can be performed to decrease discomfort, and offers statements intended to develop the patient's confidence in herself and in hospital personnel.

This nursing approach was utilized with patients in the experimental group before surgery, the day of surgery, and on the first postoperative day. The patient in the control group did not receive this nursing approach. The only significant difference found between these groups was that the hospital length of stay was shorter for the experimental group than for the control group.⁸

The first major teaching-learning study was conducted by Healy.⁹ Three hundred and twenty-one general surgical patients participated in a preoperative teaching program. The experimental group of 181 patients received instructions about deep breathing, turning, coughing, body mechanics, and an explanation of the specific procedures expected with the particular surgery. These instructions began in conversation on the evening before surgery, were followed

by demonstrations, and ended with reinforcement of content and the answering of questions. The 140 patients in the control group were admitted on the "busy evenings" and received reassurance, but the preoperative instructions and explanations lacked explicit details, specific instruction, and follow-up practice.⁹

In the patient experimental group, 152 had major abdominal surgery. Of these, 135 went home three to four days earlier than the expected discharge day. Only three patients were discharged prior to the expected date in the control group.⁹ The difficulty with this study was that, upon analysis, several differences in the two groups were identified, and the author did not use a consistent detailed/organized preoperative teaching program.

After considering Healy's study, Lindeman and Aernam¹⁰ developed a detailed preoperative teaching program to determine if it was the content or the method of instructing patients preoperatively that influenced their response when asked to deep breathe and cough preoperatively. The subjects were 15 years or older, admitted under non-emergency conditions, scheduled for general anesthesia, able to cooperate for ventilating function tests, and not on intermittent positive pressure breathing therapy. There were 135 patients in the control group and 126 patients in the experimental group.

Classification of surgical procedures were as follows: major chest and neck, minor chest, lower abdominal, upper abdominal, major vaginal, minor vaginal, genito-urinary, and rectal procedures.¹⁰ Before structured preoperative teaching was conducted, investigators defined and described an effective

"postoperative stir-up regime"; formulated a teaching plan that delineated the content and process of preoperative teaching, developed teaching aids for staff and patient instruction, and retrained nursing personnel on surgical units. Once this preparatory phase was completed, patients were admitted to the experimental group and instructed on the evening prior to surgery by a registered nurse. The structural preoperative teaching included how to deep breathe, cough, and carry out the "stir-up routine," which consisted of leg and feet exercises. The methods of teaching included group instruction, return demonstrations on a one-to-one patient-nurse basis, an audiovisual program viewed by the patient, and a pamphlet given to each patient explaining the instruction. The patients admitted to the control group received an unstructured form of preoperative teaching characterized by inconsistency and vagueness with each nurse teaching the patients what that particular nurse believed was correct.¹⁰

To determine whether structured preoperative teaching could reduce the average length of hospital stay for a surgical patient, an analysis of variance was completed on the mean length of hospital stay for the two groups. It was significant beyond the 0.02 level.¹⁰

Lindeman¹¹ developed another study with a similar structured teaching program to determine the effectiveness and efficiency of individual preoperative teaching as well as group preoperative teaching. Analysis of the teaching program was made using several dependent variables, including length of

hospital stay, number of analgesics used postoperatively, ventilatory function, and length of patient learning time before surgery. Other variables examined were the patient's age, smoking history, and site of incision. Individual teaching was similar to the techniques previously used by Lindeman and Aernam.¹⁰ Group instruction was conducted in a conference room with a group of patients on the evening prior to surgery. During the group instruction audiovisual aids were used, questions were answered, and exercises were taught and practiced.¹¹

Lindeman¹¹ found that group preoperative teaching and individual teaching were equally effective as measured by postoperative ventilating functions, length of hospital stay, and the number of analgesics administered postoperatively. However, group teaching was found to be more efficient due to a significantly shorter length of learning time as compared to those who had individual teaching.

Mezzanotte¹² carried out group instruction in a study of six groups of patients, averaging four patients per group. This study limited its patient population to those having elective abdominal surgery. The instructions included four major areas of information, general instruction in preparation for surgery, hospital policies, ways for controlling postsurgical pain, and activities that would promote recovery. Classes were held on the evening prior to surgery. Exercises were explained and practiced, and instruction sheets were given to each patient to reinforce the teaching.¹² To evaluate this form of

preoperative teaching, the investigator used a specific printed guide to interview each patient five to seven days following surgery. All of the patients believed that the group preoperative teaching was beneficial, although no statistical analysis was available.¹²

Hathaway¹³ conducted a meta-analysis on 68 studies to examine the effects of preoperative instruction on postoperative outcomes. She reported that preoperative instruction accounts for a 20 percent improvement in postoperative outcomes. Although magnitude and consistency of benefits derived from preoperative instruction remain small, this practice positively influences the recovery of many surgical patients.¹³

CHAPTER III

METHODOLOGY

Type of Study

This study employs a chart review with an experimental group-control group design. It is intended to evaluate the effect of a structured preoperative teaching program on the postoperative recovery of the patient with cemented total knee replacement.

Purpose

The purpose of this study is to determine if the preoperative teaching program reduces the length of hospital stay. The teaching program includes the following:

1. View a 10-minute video that discusses biomechanics of the knee, surgical procedures, equipment used during and after surgery;
2. Discussion of psychological or emotional problems with the preoperative nursing staff, which includes a question-and-answer period about the upcoming surgery;
3. Review of total knee replacement exercises, transfers, and ambulation with a physical therapist.

Setting

The study was conducted at United Hospital in Grand Forks, North Dakota. The general hospital is licensed for 352 beds and is located in a regional medical center complex.

Sample

The data collection phase extended from January 1, 1990 to December 31, 1991. Letters of consent were sent to patients of Dr. Brian T. Briggs, M.D., orthopaedic surgeon, who received total knee replacements in that time frame.

After receiving the completed consent forms, the qualified patients were placed in the appropriate group: total knee replacements with preoperative instruction, or total knee replacements without preoperative instruction. Twenty subjects were randomly chosen for each group.

Criteria for the selection of the patient-subject include:

1. Male or female, between the ages of 40 and 85, scheduled for their first total knee replacement
2. Total knee replacement was cemented
3. Literate in the English language
4. No history of previous skeletal, neurological, or muscular disease
5. Total knee replacement performed by Brian T. Briggs, M.D., orthopedic surgeon.

Method of Data Collection and Analysis

The data obtained from the charts of those patients who met the selection criteria were analyzed to determine each patient's length of hospital stay. The length of stay was defined as the number of 24-hour periods the patient remained in the hospital, not including the day of surgery. The results were tabulated, and analysis of variance of means completed, with appropriate t-test application. The t-test with level of significance at 0.05 was applied to the data. The t-test is similar to the usual Z-score formula, with the difference being the shape of the sampling distribution of the t-test statistic as the sample size changes. The t-test is applicable for small sample sizes, which makes it appropriate for this study.

CHAPTER IV

CONCLUSION

The hypothetical outcomes of this study involve three possibilities. The first possibility would entail no significant difference between the control group and the experimental group which received preoperative instruction. This would lead us to believe that the preoperative instructions had no implication on the length of hospitalization. It is important to note that this study proposal involved one diagnosis, or a physician, and a small patient population who only performed strengthening exercises for one week prior to surgery. In further studies, it would be beneficial to have an additional experimental group who received preoperative instructions six weeks prior to surgery to allow a more extensive preoperative strengthening program. In addition, it would be interesting to explore the psychological benefits of preoperative instruction, although this was not discussed extensively in this study proposal.

The second hypothetical outcome is a significantly shorter hospitalization in the experimental group. This would offer additional support to the performance of preoperative instructions. Again, we must remember that this study is not all encompassing due to its limited diagnosis and geographical area. Further research would be required to support preoperative instructions for this.

The third possibility is a significantly shorter hospitalization in the control group. This would imply a possible flaw in the preoperative instruction which may have caused the patients to be overly anxious or concerned about the surgical procedure. It may also be caused by the small number of patients involved in the study. This author does not believe this outcome would abolish the use of preoperative instruction. It is the belief of this author that it would spark a renewed interest in the efficacy of preoperative instruction.

During the era of health care reform, all aspects of the medical profession are directed toward cost reduction. Any procedure that does not reduce the quality of patient care should be eliminated. The advent of preoperative instruction is one quarter of a century old, and the data that justify its use is questionable. This study proposed takes a small look at the critical pathway used at United Hospital in Grand Forks, North Dakota for total knee replacement patients. Because the study contained only one diagnosis and one physician, excess variables were eliminated. This makes the implications of the study smaller. With the results of this study, we as medical professionals need to conduct further studies to encompass larger patient populations, diagnoses, and additional geographical areas.

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